

# NEURON, HIERARCHICAL NEURAL NETWORK CONSTITUTED BY USING THE NEURON AND MULTIPLICATION CIRCUIT USED FOR MULTIPLYING PROCESSING INSIDE THE NEURON

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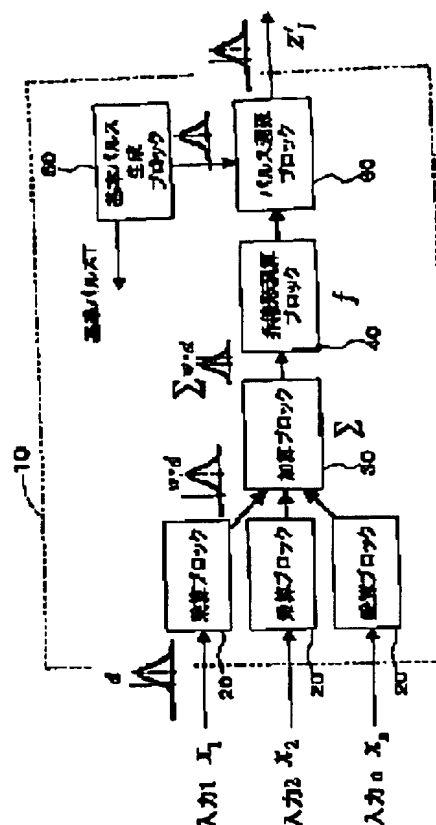
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## Abstract of JP2001043205

**PROBLEM TO BE SOLVED:** To express excited coupling and suppressed coupling with one signal and to contribute to reduction in the circuit area of a neural network by devising a signal to be processed by a neuron when composing the neural network of a digital electronic circuit.

**SOLUTION:** On the assumption that the delay time of each pulse in an input signal  $x_i$  has the normal distribution of  $N(x, 1)$ , a multiplication block 20 calculates a numerical value according to the normal distribution of  $N(wx, 1)$  while using a correspondence coefficient ( $w$ ) of coupling. Next, an addition block 30 successively adds numerical values calculated by the respective multiplication blocks 20 and continuously, a nonlinear function block 40 counts the number of positive numerical values among the values added by the addition block 30. A pulse delay block 60 delays a pulse for output, for which delay time has the normal distribution of average '0', generated by a basic pulse generation block 50 on the basis of the arithmetic result of the nonlinear arithmetic block 40 and outputs the result as an output signal  $z_j'$ .



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